

### 3 | PREPARING FOR THE REVOLUTION

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*Technology, one of the greatest testaments to human genius, is heading for a collision with society as we know it. A surge in unemployment, stagnant wages, reduced tax receipts, increased public deficits, and increased poverty and inequality will result if we do not quickly put our minds and hearts to improving our social and economic models.*

**I**f you happened to be on the streets of Pittsburgh on 19 May 2016, you may well have witnessed a black car that looked akin to that driven by superheroes, driving itself. If you are a taxi driver this will be a cause for concern. It was an Uber.

Uber is not alone. Google, Apple and General Motors are all working on autonomous vehicles. And then there are the start-ups. Zoox is one of 13 companies that has received test licences from California. Already valued at over \$1bn, Zoox believes it can deploy a fleet of fully autonomous vehicles by 2020.

Taxi drivers and their families are not the only ones who should be concerned. Late last year in Baden-Württemberg, a Mercedes lorry was driving itself at 50 miles per hour, along a busy section of motorway.

There are 600,000 HGV registered licensed drivers in the UK; 242,200 licensed taxi and private hire vehicles and around 1.8 million people in the expanded logistics

workforce. Many will be delivery drivers, couriers, van drivers or small lorry drivers.

Such ground breaking technologies are just the tip of the iceberg. It is not only professional drivers who need to worry. We all do.

The World Economic Forum predicts more than seven million jobs in the world's largest economies will be threatened in the next few years by advances in fields such as robotics and 3D printing. According to the *Future of Employment* report, 47 per cent of jobs in the US are at risk of being automated over the next two decades and 57 per cent across the OECD. These will not necessarily lead to unemployment: new jobs could emerge in their place. But there is at the very least a need to plan for this eventuality.

This is not the first time that a technological revolution has threatened us. In the 1970s and 80s, mainframe computers and robots had a huge impact. Since then our manufacturing workforce has fallen by 60 per cent.

For those made redundant, this technology was a curse. For the wider economy, it was a blessing. Increased productivity has led to total manufacturing output today being 6 per cent higher over the same period.

Some commentators, such as Dr Robert Cohen, argue that as in the 70s and 80s, the fears over the consequences of new technologies are exaggerated. It is true the changes in the 70s and 80s were mitigated by substantial growth in service sector employment. But this time, technology is impacting the service sectors too.

Klaus Schwab argues that "this revolution is fundamentally different in nature, characterised by a range of new technologies that are fusing the physical, digital and biological worlds, impacting all disciplines, economies and industries".

Today automation and artificial intelligence are progressing at a speed, scale and force unlike anything we have experienced before. Sooner or later the challenge

of human redundancy will have to be reckoned with. Machines are now capable of cognitive functions; we are heading towards a time when machines will be able to independently solve problems, overcome complex decisions and learn. Google's DeepMind's ability to beat various human gaming champions is especially remarkable not just because the technology ultimately prevailed, but because DeepMind largely trained itself.

Machine learning is likely to be the primary catalyst behind a surge of applications in automation and robotics and a nearly limitless number of specialised applications. Collectively, these systems are likely to span the entire job market and economy. Already, the automated intelligent response technology behind virtual assistants (assistants that are already taking the jobs of real people), is no longer futuristic nor at the cutting edge. Rather, robots, artificial intelligence, computerised algorithms and mobile sensors are the new vanguard. As the Brookings Institute put it, they are here and set to "transform human life".

Ultimately then, we should assume that computers will replace effectively all manufacturing and most routine based jobs, while artificial intelligence and deep learning technologies will lead to the destruction of many white collar professional jobs. When a robot can read a set of accounts, analyse a million emails or phone records, write annual reports, why employ a lawyer, researcher or accountant?

Richard Susskind agrees that the "traditional professions will be demystified, routinised and commoditised". Doctors, academics, pharmacists, engineers be warned. As these 'good' jobs begin to evaporate, faith in education and training as the solution to technological disruption of the job market will erode.

In contrast, the sharing economy may seem quaint by comparison but it is also another significant threat to jobs. Airbnb, for example, now dwarfs even the largest hotel

chains but still has under a thousand employees compared with Hilton's 164,000.

Policy needs to meet this challenge head on. Not just the challenge of the loss of jobs but also the fact that the benefits from this tech-driven productivity surge keep accruing to an ever smaller group. Just as businesses need to adapt, our government must too.

With its perennial trade and budget deficits the UK already has structural issues to contend with in addition to the technological challenge. Fortunately it also has some big advantages. We have a great science base, a great technological base, a great creative base and a great entrepreneurial base. We have to build on them all. Eventually technology can deliver us large productivity gains and economic growth. So long as public policy tools are devised to ensure a fair distribution of the spoils, this productivity increase will enable everyone to be better off.

## **Meeting the challenges**

### **Unemployment, skills and education**

Many new jobs and opportunities will be created as technology develops. Any country needs to have the skills to exploit them or others will; it is not a given that all will share in the fruits of this latest revolution.

For the UK specifically there are real dangers. We already have a chronic skills shortage which will only intensify given that manufacturers expect their demand for skilled workers to rise. As an adviser to many companies I can tell you that I hear time and time again that we cannot get enough people with the right skills. In my view it is this that holds many UK companies back, not the lack of finance. How frustrating when so many of our population are stuck in low paid jobs.

Labour's agenda on skills and apprenticeships is heading in the right direction, but has much further to go.

An education system that is fit for purpose is an imperative. Transforming what and how we teach is critical. Everything is changing. Our education system must be more responsive to the needs of employers. Instead of pushing so many into the university system we need to improve our vocational and technical colleges so that they offer an exciting and relevant alternative.

Our core curriculum should be mathematics, reading and writing, coding, problem solving and free thinking. Education should be collaborative, research-based, and self-directed; it should relate to real world challenges and have input from employers and trade bodies. In doing so we should ensure that every child regardless of background gets the chance of economic advancement by ensuring they can keep up with the skills demanded in the economy. As new jobs replace old jobs, we must equip people with the skills to adapt.

### Encouraging entrepreneurialism and supporting business

Access to technology will soon be ubiquitous and many are already able to invent new products and services cheaply and quickly. The business models of each and every industry are being transformed.

We have to support our companies capable of scale so that they benefit from this state of flux. Unless they are successful in new technologies, the UK will face certain comparative decline. Entrepreneurialism must be engrained culturally across all of society not just at private schools. We will need more start ups and more companies able to scale up to a globally significant level.

We can do this. It takes much less capital to start a digital business compared to the capital intensive industries of old. Thanks to the Enterprise Investment Scheme (which we must expand to support more mature scalable businesses) there is already plenty of finance available to

start ups. The small business research and development tax credits scheme likewise needs refining and expanding.

## Taxation

Technology, like global trade, increases overall prosperity but creates winners and losers. So much of technology is focused on driving corporate margins that most of the benefits accrue to capital whilst the corresponding job losses pass liabilities on to the already stretched welfare state. We have to establish how to compensate workers as their share of national income shrinks and as jobs disappear. Without managing the distribution of the spoils society could easily fracture.

There need not be a dystopian outcome. It is not just, or sustainable, for corporate profits to have an ever increasing share of GDP whilst real wages flatline, despite huge gains in economic output. In such an environment, middle class workers will continually be squeezed. They will not be the only ones. We have already witnessed large public companies being put out of business by private companies, often majority owned by just a few individuals. This further exacerbates inequality. Not only do the millions of owners of publicly owned companies lose their investment but the few who benefit are notoriously under-taxed.

In order to prevent the wholesale abuses we see today, we need to make dramatic changes to our approach to tax and push our European partners to do the same. Without adequate tax on the owners of technology and without investment in education and skills, we are heading back to the world of barons and serfs. Serfs whose only economic function is to serve the wealthy.

Taxing the owners of technology is not simple however especially as technology owners can be entirely remote. Governments are going to need new tools, new laws and new ideas to adequately tax the owners of technology.

Governments are going to need to innovate in the same way that entrepreneurs innovate.

### Industrial policy

The UK is in desperate need of an industrial strategy. One that funds research and development and supports companies seeking to commercialise our scientific excellence. We need to support our home grown technology companies. Despite our vibrant start up scene, the UK's most exciting companies often never make it to global status partly because they get acquired by US firms before they get there. We should develop both sticks and carrots to encourage businesses to stay British. But we should also make sure that we do not end up nationalising the risks of innovation whilst privatising the profit. To prevent this, British companies that receive state support should guarantee that their company headquarters will remain in the UK, they will pay corporate tax in the UK, their company founders will stay tax domiciled in the UK and their investors will pay tax on gains in the UK.

### Trade unions

Embarking on a new industrial policy without a full partnership with trade unions would be folly. For any renaissance in the British economy we are going to need healthy and vibrant trade unions, respected by business with a new sense of shared mission, and partnership. A new collectivism with trade unions at the heart of it.

To meet this role, unions must modernise, drop the class warfare rhetoric, and stop clinging to old dogmas. Unions have many reasons to feel aggrieved but they have to move on if they are to serve their members well. Workers today need strong, representative, forward-thinking, pragmatic, unions. Trade unions that see the dangers

and opportunities of this digital revolution. In return for a compact such that we see in countries like Germany, government should roll back much of the egregious anti-union legislation that has accumulated over the past decades.

## **Preparing for the revolution**

Despite how it may feel, we are not at the end or even the middle of the digital revolution. We are perhaps only at the end of the beginning. From the perspective of history we are at the equivalent point of having laid down the tracks for the railways, but only witnessed a few engines testing them.

It is probable that in the developed world, the digital revolution has thus far created more jobs than it has destroyed. But we are yet to witness the incredible destruction that the application of the newly developed technologies will unleash. All of this portends a social, economic and political disruption for which we are completely unprepared. Widespread unemployment (or even underemployment) has clear potential to tear society apart. It also carries substantial economic risks: in a world of declining jobs where will demand growth come from?

Not preparing our country adequately will lead society to a very harsh destination. It doesn't have to be this way. Technology can lead humanity to the promised land. Fewer working hours, less disease, improved human efficiency, smarter learning and greater understanding and communication. But unmanaged it could also lead us back to a desperate period of neo-serfdom.